

STATE OF ALASKA DOT&PF

MATERIAL SITE INVENTORY

STATUS & INSPECTION

REPORTS

CENTRAL REGION

SOUTHERN GLENN HIGHWAY

& EAGLE RIVER-CHUGIAK ROADS

VOLUME 1 OF 1

PRIMARY ROUTE NO. 42 – GLENN HIGHWAY
MILEPOST 0 (ANCHORAGE)
TO 118.5 (EUREKA SUMMIT)

SECONDARY ROUTE NOS. 550 & 559
EAGLE RIVER-CHUGIAK ROADS

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STATEWIDE MATERIAL SITE INVENTORY

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**EAGLE RIVER & CHUGIAK ROADS
SECONDARY ROUTE NOS. 550 & 559**

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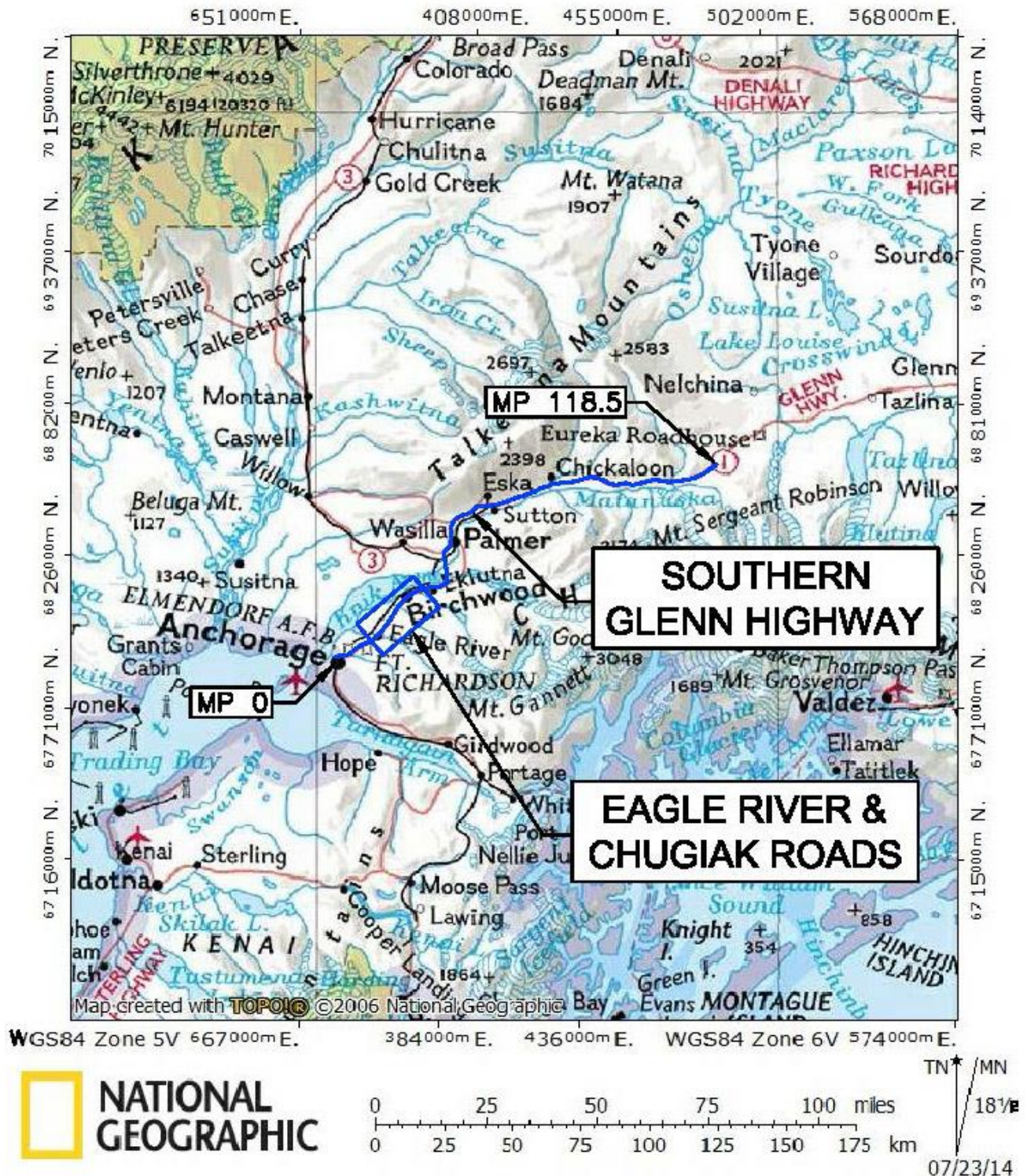
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VICINITY MAP



STATE OF ALASKA DOT&PF STATEWIDE MATERIAL SITE INVENTORY

STATUS & INSPECTION REPORTS

PRIMARY ROUTE NO. 42 – GLENN HIGHWAY MILEPOST 0 (ANCHORAGE) TO 118.5 (EUREKA SUMMIT)

EAGLE RIVER & CHUGIAK ROADS SECONDARY ROUTE NOS. 550 & 559

1.0 MATERIAL SITE NUMBERING

Alaska Department of Transportation and Public Facilities (DOT&PF) material site numbers for the Southern Glenn Highway plus Eagle River and Chugiak Roads were assigned using the following format.

For primary route system coding, i.e. 42-1-001-1:

- The first two digits represent the Primary Federal Aid Route Number, for the Southern Glenn Highway this number is 42.
- The third digit represents the control section of the route. For this portion of the Southern Glenn Highway the section number is 1, 2, or 3.
 1. Anchorage (MP 0) to Palmer (MP 43)
 2. Palmer (MP 49) to Caribou Creek (MP107)
 3. Caribou Creek (MP 107) to Gunsight Mountain (MP 118.5)
- The 4th, 5th and 6th digits are the assigned site numbers for the Southern Glenn Highway.
- The last digit is the region in which the site is located. For Central Region the number is 1.

Using secondary route system coding, i.e. 559-1036-1:

- The first three digits represent the Secondary Federal Aid Route Number, for Eagle River Roads this number is 550, for Chugiak Roads this number is 559.
- The 4th, 5th and 6th and sometime 7th digits are the assigned site number.
- The last digit is the region in which the site is located. For Central Region the number is 1.

2.0 MATERIAL SITE CLASSIFICATION AND STATUS

Material site classification and status was determined during the inventory for the sites along the Southern Glenn Highway and in the Eagle River and Chugiak area. Classification and status is current as of the date on the cover sheets of the Inspection and Status Reports, but both may have changed since that date. Therefore the reader is directed to DOT&PF Central Region Right-of-Way or Materials Sections for updates and current information. Criteria for determining classification and status for material sites along the Southern Glenn Highway are outlined below.

CLASSIFICATION

- ACTIVE – Sites that DOT&PF apparently has an interest in. Along the Southern Glenn Highway active sites are typically considered active for the following reasons:
 - Sites that have current DNR or BLM Contracts or right-of-ways (ACTIVE OPEN).
 - Sites that have expired DNR Contracts but the case file abstract indicates they are not closed (ACTIVE-UNKNOWN).
 - MS 42-011-5 which is an indefinite BLM right-of-way grant, part of which is administered by Ahtna (ACTIVE-OPEN).
- INACTIVE – Sites (with MS numbers) that DOT&PF apparently no longer has any interest in and/or are no longer available for extracting material. This may be due to relinquishment of the site by DOT&PF or closure by agencies.

STATUS

- OPEN – Active sites that are open and apparently available for mining. There are apparently 9 open sites along the Southern Glenn Highway. This includes sites like MS 42-2-336-1 near Ida Lake where the original site is closed but the current site is undeveloped.
- UNDEVELOPED – Active sites that have not been opened but are apparently available for mining. There is apparently one open site along the Southern Glenn Highway. Some STATUS UNKNOWN sites are also undeveloped but right-of-way and logistical issues must be cleared up before they can be opened.
- STATUS UNKNOWN – Twelve sites along the Southern Glenn Highway that DOT&PF has an interest in but there are right-of-way issues surrounding them that are beyond the scope of this inventory program to clarify.

- a. This includes three sites on JBER inside the boundary fence. None of these sites are presently being used and it is not clear if they can be. One site, MS 42-1-041-1 is next to the landfill and while it lies on JBER it is not behind the fence. However, the site is mostly taken up by a very large stockpile of unknown ownership.
- b. Also sites like DOT&PF MS 42-1-363-1 at Reflection Lake that DOT&PF tried to relinquish but was not allowed to because of trash on the site. The site area has been included in the Palmer Hay Flats Refuge and there is no available remaining material.
- c. Sites with complex right-of-way political and permitting issues such as MS 42-1-027-1 near Chugach High School.
- d. Sites north of Anchorage that are involved in North Anchorage Land Agreement (NALA).
- e. Sites where permits have expired recently but it is not clear if DOT&PF will renew them.
- f. Sites like MS 42-1-011-1 at Hicks Creek where the site is closed but it is an MMS site and it is not clear if DOT&PF will reapply for the site. It is not clear if DOT&PF has been issued an ILMA for MS 42-2-310-1 or not.
- g. A site including the Sheep Creek Airport (MS 42-3-101-1) where DOT&PF may not have the right to remove materials except where waterways need to be deepened to prevent flooding.

The status of a site labeled as STATUS-UNKNOWN should be clarified with Central Region DOT&PF ROW prior to excavation.

- CLOSED – Includes 58 sites in which permits have expired, been terminated, or otherwise closed and no further consideration of the site is apparently planned. This does not necessarily mean that another site could not be located on or near the original sites.
- POTENTIAL - An example of this is MS 42-2-010-1 where there is apparently significant material available but DOT&PF apparently has no permitted access and the site is closed. This site has been categorized as INACTIVE-POTENTIAL assuming that access can be re-established.
- REMOVED – A site intended for construction of the Anchorage Scale Station. In this case it appears that a material site number was used as a right-of-way number and the site should be removed from the Material Site Inventory. The site has been categorized as INACTIVE-REMOVED.

OTHER CLASSIFICATION ACTIONS

- Two or more sites were combined into one where they are essentially the same site. This typically occurs where older sites are incorporated into newer sites. Depending on permit status either number may become the primary number.
- Typographical errors on documents can result in a site having two or more site numbers. This usually involves the region number but it can also involve the section number i.e. MS 42-3-313-1 is the correct site number and 42-1-313-1 is a typo.
- Access roads with their own Material Site Number were combined with the site they provide access to.
- Two supposed sites (MS 42-1-027-1b & c) were noted during scanning of the material site files. These appear to be file numbers for a very large file >600 pages) and not material site numbers. However, they now are listed in some places as material site numbers.

3.0 GEOLOGIC SETTING

The following information is general in nature and is intended to provide those who are unfamiliar with the area with a general description of the geology, and how it relates to material sites. This information is not intended to be complete. More detailed investigations should be performed before decisions are made on individual material sites.

3.1 Location and History

The inventory area lies along the Southern Glenn Highway corridor between Milepost (MP) 0 in downtown Anchorage and Gunsight Mountain at MP 118.5 (near the Alascom road intersection). The Glenn Highway (numbered Interstate A-1 and Alaska Route 1) runs 189 miles (520 km), beginning in downtown Anchorage, terminating at the Richardson Highway in Glennallen (MP 189). It has been separated into Southern (Central Region) and Northern (Northern Region) segments to reflect the two DOT&PF regions it traverses. It should be noted that there is a gap in the mileposts between MP 42 and MP 49 north of Palmer. At one time the Tok Cutoff Highway was also named the Glenn Highway and it is labeled such on many of the U.S.G.S. Maps.

The Glenn Highway is a major link in Alaska's ground transportation system. It provides the shortest, most direct surface route between Anchorage (and the Kenai Peninsula) and transportation corridors leading through Canada to the contiguous United States. Within the state the Glenn Highway provides the most direct access from Anchorage and the Kenai Peninsula to Glennallen, Valdez, Gulkana, Tok and Delta. The road is a critical part of Alaska's infrastructure.

The Glenn Highway follows one of the most important transportation routes in Alaska. Between MP 0 and MP 38, it forms the only road access for the interior road system to Anchorage and Kenai Peninsula area communities. East of Palmer (MP 42), the highway forms the principle road link between Anchorage (Alaska's largest metropolitan area) and the Richardson Highway system. The corridor travels through several distinct urban areas between Anchorage and Palmer; Anchorage (MP 0 to 4), Ft. Richardson (MP 6 to 10), Eagle River (MP 12 to 18), Chugiak (MP 20 to 23), Eklutna (MP 26 to 27), Palmer (MP 38 to 49). East of Palmer, several small settlements lie along the Southern Glenn Highway corridor, including Sutton (MP 61), Chickaloon (MP 78), Victory (MP 94), and Glacier View (MP 104).

The Glenn Highway, originally known as the Palmer Highway, originated in the 1930's to link Anchorage with the agricultural colony at Palmer. The highway link between Palmer and Glennallen was constructed during WWII as part of the military operations that also resulted in the Alaska Highway, the original road link between Anchorage and the continental highway system. The highway has been extensively improved and straightened through a variety of projects in its lifetime. Sections of abandoned roads can be observed on aerial photographs and maps. The highway alignment shown on U. S. Geological Survey topographic maps show the location of the highway at the time the map was prepared. However, in many places the road has since been realigned. A black line has been added to both the area and location maps in areas where the road appears to deviate from the mapped location. The black line is reportedly based on a compilation of centerline surveys performed by DOT&PF.

3.2 General Geology

The Southern Glenn Highway corridor begins in downtown Anchorage on Cook Inlet, crosses the Knik and Matanuska Rivers, and follows west along the north side of the Matanuska River to Gunsight Mountain. The surficial geology along the Southern Glenn Highway corridor is dominated by glacial processes and the majority of material sources along this corridor are located within glacial or glaciofluvial deposits. The area crosses two physiographic provinces.

1. Cook Inlet–Susitna Lowlands – MP 0 to MP 41
2. Upper Matanuska Valley – MP 41 to MP 118.5

Sand and gravel borrow pits dominate the available material sources between Anchorage and Gunsight Mountain. Occasional bedrock sources are available. The bedrock sources appear to be associated with the Talkeetna Mountains and Kenai-Chugach Mountains physiographic provinces that flank the highway to the north and south along the majority of the alignment north of the Knik Arm crossing between MP 30 and MP 32. Sand and gravel deposits are typically on glaciofluvial outwash planes or fluvial floodplains. Occasional alluvial fan deposits are present.

Permafrost is generally absent along the highway alignment from Anchorage to the Chickaloon River. It occasionally occurs in isolated masses at high altitudes and in lowland areas of low ground insolation and high ground insulation. Permafrost is discontinuous from Chickaloon River to Eureka Summit where the area becomes mountainous and is underlain by bedrock at or near the surface. The variations in materials, moisture, and ground cover can cause extreme variation in the presence or thickness of permafrost.

3.2.1 Cook Inlet - Susitna Lowlands MP 0 to MP 41

The region is glaciated lowland characterized by glacial deposits mantling Tertiary bedrock that is typically of poor quality. The Southern Glenn Highway corridor begins in the Anchorage Bowl, in a zone of transition between the Cook Inlet-Susitna Lowland physiographic province to the west, terrain characterized by relatively flat, low ground containing areas of glacial moraine, ice-contact, and outwash features; and the Kenai-Chugach Mountains Physiographic province to the east, terrain characterized by moderately high and rugged mountains. The Anchorage Bowl is located along the margin of the Cook Inlet-Susitna Lowland physiographic province and the Kenai-Chugach Mountains physiographic province to the east. The area is characterized as a glaciated lowland containing areas of ground moraine and stagnant ice topography, drumlin fields, eskers, and outwash plains with rugged mountains located immediately to the east.

Eagle River is bounded by Knik Arm on the north, broad outwash plains to the west, and the Chugach Mountains to the south and east. The lowland is part of the larger Cook Inlet-Susitna geologic structural basin which is surrounded by the Chugach, Talkeetna, and Alaska Mountain Ranges. Within the basin, bedrock is generally overlain by relatively thick unconsolidated glacial, fluvial, and marine sediments, whereas in the adjacent mountains, bedrock is commonly exposed at the surface or covered with a relatively thin

veneer of sediment. The Anchorage bowl was last covered with glacial ice during the middle to late Pleistocene age, as evidenced by local topography and soil stratigraphy. This region of Alaska is considered to be generally free of permafrost except where isolated masses of permafrost occur in lowland areas where ground insulation is high, such as muskeg terrain. The Cook Inlet–Susitna basin and Chugach Mountains are in a relatively active seismic zone and are bisected by several inactive and active faults.

3.2.2 Upper Matanuska Valley MP 41 to MP 118.5

At the height of the last major glaciation, ice from the Matanuska Valley extended almost to Anchorage and ice from the Nelchina area spread north and east across the Glenn Highway corridor. Retreat from these extended positions differed for each ice mass. The Matanuska Valley glacier stagnated in the Palmer area leaving huge slowly melting blocks of ice, while the active glacier margin receded rapidly up valley. The retreating glacier deposited a blanket of till over much of the U-shaped valley floor between Granite Creek and the Chickaloon River. Meltwater streams flowed away from the glacier margins and in combination with the melting ice blocks, deposited tremendous volumes of outwash and esker and kame gravels in the Palmer area. The Long Lake – Bonnie Lake area was scoured by the ice and deglaciated with almost no deposition. Up valley of the strongly bedrock controlled Long Lake area generally thin glacial drift was deposited over undulating bedrock terrain. Several meltwater channels were cut and partially filled with outwash by the ice as it neared a temporary stand still position in the Hundred Mile Lake Area. Further retreat brought the Matanuska Glacier to near its present position. The Nelchina area glaciers underwent active retreat depositing till sheets which blanketed the bedrock in the Eureka Summit area. Most of the glacial deposits that lie in the Glenn Highway Corridor resulted from the last major glaciation.

Beneath the Southern Glenn Highway, the sequence of rocks consist of Jurassic Talkeetna formation - interbedded marine volcanic and clastic sedimentary rocks which are thought to be related to an island arc environment. Exposures of the Talkeetna formation are limited to the Caribou Creek and Sheep Mountain Areas. Unconformably overlying the Talkeetna formation is the Cretaceous age Matanuska formation. The lithologies are described as being composed of a thick shale sequence overlain by an interbedded conglomerate, greywacke, sandstone, and shale sequence, generally representing a deep water marine environment. Rocks of the Matanuska formation are exposed throughout the project corridor.

Cretaceous age orogenic events in the Talkeetna Mountains and Alaska Range coupled with regional uplift, set the stage for the deposition of continental sediments, during the Tertiary period. Three such formations are recognized. The Chickaloon formation unconformably overlies the Matanuska formation. This grades upward into the Wishbone formation which in turn is unconformably overlain by the Tsadaka formation. The younger formations predominantly contain conglomerate and sandstone, whereas the Chickaloon formation contains abundant fine-grained clastic rocks and bituminous coal in addition to sandstone and conglomerate. The Chickaloon formation is exposed throughout the corri-

dor west of Pinochle Creek, and the Wishbone and Tasadaka formations crop out only near Wishbone Hill and Tsadaka Canyon respectively.

Erosion of the Chugach and Talkeetna mountains by the glaciers greatly modified the fluvial terrain, carving classic bowl shaped cirques, sharp horns, arête' ridges and cols. The pre-existing fluvial Matanuska Valley was gouged out to form a wide U-shaped valley, with an undulating floor; except in the Long Lake – Bonnie Lake area where uplifted resistant bedrock units stand as steep cliffs which rise above the valley profile.

Intruded or “infaulked” into the various marine and continental formations are numerous igneous bodies. Lithologies of these Tertiary rocks range from mafic to felsic and include both fine-grained and coarse-grained varieties. Major areas of exposure include the King Mountain area, the Long Lake – Bonnie Lake area, and Lion Head and areas east to about Bug Lake. The rocks best suited for use as general construction materials include the igneous units, but any of the competent rocks may be used. High quality rip-rap or paving aggregates material may be derived from the igneous rocks

3.3 Downtown Anchorage to Eklutna Flats (MP 0 to MP 27)

The highway corridor begins on relatively flat glaciofluvial deposits mantling older glacial deposits in Anchorage and then passes onto glacial till and glaciofluvial deposits associated with the Elmendorf Moraine near Fort Richardson. There are existing commercial rock quarries in Chugiak and Eklutna. The highway passes along the eastern edge of the Anchorage Bowl just before the terrain rises into the Chugach Mountains to the east. DOT&PF has 36 closed material sites along the Southern Glenn Highway plus 11 closed sites on Eagle River and Chugiak Roads. There were six active material sites with significant quantities of sand and gravel in the glaciofluvial deposits. None of the active sites are currently operational with the exception of MS 42-1-041-1 where it appears material is being stockpiled. Three of the active material sources lie within the Joint Elmendorf-Richardson (JBER) military reservation and utilization has not been widely successful. The rest of the active sites have political, permitting, right-of-way and access issues that may or may not be possible to resolve. At this time most of the sand and gravel used in Anchorage comes from large commercial pits in the Matanuska Valley and is transported by train.

Economically, potential sand and gravel sources between Eagle River and Chugiak are important as this area lies farthest from the train unloading facilities in west Anchorage. While there are significant sources of gravel in this area, they are being depleted, or developed, or dedicated to other uses at a rapid rate. Eventually, even commercial sources in this area will be depleted raising the costs of highway construction and maintenance.

3.4 Eklutna Flats to Parks Highway Interchange (MP 27 to MP 35)

As the highway crosses the Eklutna Flats and turns north towards Wasilla and Palmer passing over the Palmer Hay Flats Refuge it crosses Holocene intertidal deposits that typically consist of silt and sand. The Eklutna Flats and the Knik and Matanuska River mouths have four inactive and four active DOT&PF material sites, none of which are being worked at this time. Two of the sites appear to be depleted or nearly depleted and the others may have permitting issues due to their presence in the Refuge. All have shallow depths to groundwater resulting in the potential need for bailing operations should they be mined in the future. There are two additional material sites lying on bedrock knobs near MP 30 on the south side of the Knik River mouth. One of the sites has the potential to produce large quantities of undifferentiated bedrock; however, the bedrock is of unproven quality. The sites on the south Anchorage side of the Knik River may need conditional use permits from the Municipality of Anchorage unless they have “grandfather rights”. Sites to the north of the of the Knik River lie within the Matanuska-Susitna Borough and the Palmer Hay Flats State Game Refuge and may require Mat-Su Borough extraction permits, again unless extraction rights are “grandfathered”. Their presence in the Game Refuge may preclude their further use. It is possible that none of these sites would be available to DOT&PF.

3.5 Parks Highway Interchange to Fishhook Junction (MP 35 to MP 49.5)

At the Parks Highway Interchange the Glenn Highway turns east towards the Matanuska River valley and passes over glacial sand and gravel deposits where six inactive material sites are located. There are several private active borrow pits mining sand and gravel in the area, but no active DOT&PF sites in this section.

3.6 Lower Matanuska Valley - Fishhook Junction to Chickaloon (MP 49.5 to MP 78)

After reaching Fishhook Junction the highway follows the north bank of the Matanuska River where glacial and fluvial deposits are prominent with occasional alluvial fan deposits. Moraine and outwash deposits are present throughout the valley except where more recent fluvial erosion has removed them. Along the river there are significant terrace gravel deposits. Most of the area north of the Glenn Highway lies within the Matanuska Valley Moose Range.

There are 8 inactive material sites between the Junction and Chickaloon. DOT&PF has four active sand and gravel material sites along this section of the alignment. All but one are located on glaciofluvial, fluvial, or alluvial deposits that are primarily on the north side of the highway. None of the sites are located on the active Matanuska River floodplain. DOT&PF has an active bedrock quarry where it is excavating a Tertiary granitic intrusion for riprap in a road cut in the vicinity of King Mountain.

It is estimated that DOT&PF has less than 750,000 c.y. in this segment of the alignment although there is abundant sand and gravel deposits in the area. There are eleven large potential sources in the Moose Range laid out by the Matanuska Valley Moose Range Management Plan. Plus the plan suggests excavating material from the active floodplain in the river.

3.7 Talkeetna Mountains - Chickaloon to Caribou Creek (MP 78 to MP 109)

Between Chickaloon and Caribou Creek the Matanuska Valley begins to narrow and the surficial deposits are dominated by glacial tills and bedrock. There are numerous landslides in this segment, ranging from small to immense slides like the Puddingstone Hill Slide. Bedrock is generally soft and it is difficult to make base course or paving aggregate that meets standard specifications. The principal DOT&PF source of material in this segment is at the Cascade Maintenance Station between MP 93 and MP 94, where there are three active sites on glaciofluvial gravels. Significant quantities of gravel have been excavated from the Matanuska River floodplain between MP 95 and MP 98, the only stretch of the highway in this segment where it is relatively easy to get to the river floodplain.

3.8 Caribou Creek to Gunsight Mountain (MP 109 to MP 118.5)

Between Caribou Creek and Gunsight Mountain the road traverses the south side of Sheep and Gunsight Mountains. It crosses glacial till and large alluvial fan deposits. There are four inactive sites in this segment and two active sites. The Sheep Mountain Airport site, MS 42-1-101-1, potentially contains large amounts of sand and gravel but it is not clear if the ILMA allows for excavation of sand and gravel. DOT&PF appears to be removing material from the site when the stream channels fill up, to prevent culverts from becoming blocked. There is a record of production of paving aggregate from MS 42-3-313-1. However, some of the tested material appears to produce low degradation values and high sodium sulphate losses when tested. Use of the material for the production of aggregates may require the lowering of the standard Degradation and Sodium Loss Specifications.

4.0 LAND USE PLANNING

State lands along the Southern Glenn Highway are being managed by the State of Alaska Department of Natural Resources (DNR) under the Susitna Matanuska Area Plan and the Southeast Susitna Area Plan. The Southeast Susitna Area Plan supersedes and replaces the Willow Sub-Basin Area Plan. The Matanuska Valley Moose Range Management Plan covers areas to the north of the Glenn Highway right-of-way from Buffalo Mine Road to Chickaloon. The area within Anchorage is not managed under a DNR land use plan. Anchorage lands are managed under Title 21 of the Municipal Code.

4.1 Susitna Matanuska Area Plan

The Susitna Matanuska Area Plan was adopted in 2011. The Susitna Matanuska Area Plan and Southeast Susitna plan replace and supersede much of the Susitna Area plan (which is still in place for the northern reaches of the Susitna drainage). The Susitna Matanuska Area plan directs how DNR will manage State land that fall within the boundaries. This area includes all state owned lands and state-selected uplands and shore lands. This land is associated with the Chugach Mountains to the East, the Talkeetna Mountains and Alaska Range to the North, and the Tordrillo Mountains west of Anchorage (which is a mountain range within the Alaska Range). Portions of the low-lying areas of the Matanuska and Susitna valleys fall in between these ranges. Within the area are several Legislatively Designated Areas (LDAs), these are not governed by the plan. The managed area includes roughly 6 million acres.

The complete plan is available on the internet at the following address:

<http://dnr.alaska.gov/mlw/planning/areaplans/sumat/>

The following excerpts from the plan are directly relevant to material sources.

Pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Area Plan, Susitna Matanuska Area Plan, Chapter 2 (adopted August 2011)* is as follows:

The following goals are for state lands in the planning area. Goals are general conditions that DNR attempts to achieve through management actions. The goals are listed alphabetically. No single goal has a priority over the others.

Economic Development. Provide opportunities for jobs and income by managing state land and resources to support a vital, self-sustaining, and diverse local economy.

Environment and Habitat. Manage state land to protect natural ecosystems, sensitive species, and wildlife habitats.

Fiscal Costs. Minimize the needs for, and the fiscal cost of, providing government services and facilities such as schools and roads.

Public Health and Safety. Maintain or enhance public health and safety for users of state land and resources.

Public Use. Provide, plan, enhance, and manage diverse opportunities for public use of state lands, including uses such as hunting, fishing, boating and other types of recreation.

Quality of Life. Maintain or enhance the quality of the natural environment including air, land and water, and fish and wildlife habitat and harvest opportunities; provide opportunities to view wildlife and the natural environment; and protect heritage resources and the character and lifestyle of the community.

Recreation. Protect recreational resources including public access and visual resources, and manage recreational activities to minimize user conflict, while providing for a range of recreational experiences on state land managed for multiple uses.

Settlement. Provide opportunities for private ownership and leasing of land currently owned by the state.

Sustained Yield. Maintain the long-term productivity and quality of renewable resources including fish and wildlife, agriculture, timber, and above-ground renewable resources.

Also pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Area Plan, Susitna Matanuska Area Plan, Chapter 2-28: Material Sites (adopted August 2011)*, reads as follows:

Material Sites

Goal

Land for State-Owned Materials Sites. Maintain in state ownership and make available to public and private users sufficient, suitably located materials sites to meet long-term economic needs of the area for material resources.

Avoidance or Minimization of Impacts. Material extraction sites are to be sited so that they avoid impacts, including but not limited to noise and dust, to adjacent residential or institutional areas (i.e., schools); environmental resources and sensitive habitats; and to fish and wildlife populations.

Coordination. When possible to do so, the state should coordinate with other landowners, including private land owners, to develop material supply sources. This goal particularly applies to material sites that are adjacent to each other but under different land ownership.

Management Guidelines

A. Preferred Material Sites. When responding to a request for a material sale or identifying a source for materials, the highest priority should be given to using existing upland material sources. Using materials from wetlands, lakes, tidelands, and active or inactive floodplain rivers or streams should be avoided unless no feasible public upland alternative exists. As a general policy, sales or permits for gravel extraction will not be permitted in known fish spawning areas or within 150 feet of known spawning areas. Material sites shall be maintained in public ownership unless the management intent language for a specific management unit indicates that it may be appropriate for alternative uses.

B. Maintaining Other Uses and Resources When Siting, Operating or Closing Material Sites. Before materials are extracted, the adjudicator will ensure that the requirements of the permit or lease adequately protect other important resources and uses. The disposal of materials should be consistent with the applicable management intent statement and management guidelines of the plan. In some instances, areas occupied by a material site may be appropriate for reuse for settlement or another form of development. When this occurs, this is noted in the ‘management intent’ of the affected unit and reuse of the parcel for the intended use is appropriate. If this occurs, the reclamation plan shall take this into consideration and account for the probable reuse.

C. Land Sales in Areas of High Material Potential. Generally, if a settlement area contains sand and gravel deposits, rock sources or other similar, high value material resources, a pit area should be identified during subdivision design and retained in state ownership for future use.

D. Screening and Rehabilitation. Material sites shall be screened from roads, residential areas, recreational areas, and other areas of significant human use. Sufficient land should be allocated to the material site to allow for such screening. Material extraction sites adjacent to the Parks Highway shall provide a vegetation buffer of 75’ or more. Rehabilitation of the site shall follow the requirements of AS 27.19.020 and 11 AAC 97.250.

E. Protection Area Adjacent to Anadromous Waterbodies. A riparian buffer of at least 150’ shall be provided adjacent to anadromous waterbodies. The adjudicator is to review the DMLW online procedures pertinent to riparian buffers and Management Guidelines G and H in the ‘Shorelands and Stream Corridors’ section of this chapter prior to issuing an authorization or disposing of an interest in state land.

F. Coordination with Matanuska-Susitna Borough. Prior to granting authorizations for material sales, the DNR should coordinate with the Matanuska-Susitna Borough to determine applicable local land use requirements.

G. Other Guidelines Affecting Materials. Other guidelines may affect the use of material resources. See other sections of this chapter.

4.2 Southeast Susitna Area Plan

The Southeast Susitna Area Plan was adopted in 2008. The planning boundary of the Southeast Susitna Area Plan includes all state owned and state selected uplands, and all tidelands, submerged lands and shorelands within the area. The planning area extends from the intersection of the Talkeetna Spur Road and the Parks Highway in the north, to the Knik Arm of Cook Inlet in the south, and is bounded by the Susitna River in the west, the Matanuska River in the east, and the Hatcher Pass Management Plan in the northeast. Thus, it includes both ends of Hatcher Pass Road. Within this planning area are a number of large Legislatively Designated Areas (LDAs) which total 386,000 acres and include: the Willow and Nancy Lake State Recreation Areas, the Palmer Hay Flat, Goose Bay, and Susitna Flats State Game Refuges, and the Little Susitna State Recreation River. The recommendations of this plan pertain primarily to the state-owned and state-selected land not within the LDAs.

The complete plan is available on the internet at the following address:

<http://dnr.alaska.gov/mlw/planning/areaplans/ssap/index.htm>

The following excerpts from the plan are directly relevant to material sources.

Pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Area Plan, Southeast Susitna Area Plan, Chapter 2 (adopted April 2008)* is as follows:

The following goals are for state lands in the planning area. Goals are general conditions that DNR attempts to achieve through management actions. The goals are listed alphabetically. No single goal has a priority over the others.

Economic Development. Provide opportunities for jobs and income by managing state land and resources to support a vital, self-sustaining local economy.

Fiscal Costs. Minimize the needs for, and the fiscal cost of, providing government services and facilities such as schools and roads.

Public Health and Safety. Maintain or enhance public health and safety for users of state land and resources.

Public Use. Provide and enhance diverse opportunities for public use of state lands, including uses such as hunting, fishing, boating and other types of recreation.

Quality of Life. Maintain or enhance the quality of the natural environment including air, land and water, and fish and wildlife habitat and harvest opportunities; and protect heritage resources and the character and lifestyle of the community.

Settlement. Provide opportunities for private ownership and leasing of land currently owned by the state.

Sustained Yield. Maintain the long-term productivity and quality of renewable resources including fish and wildlife, and timber.

Also pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Area Plan, Southeast Susitna Area Plan, Chapter 2-20: Material Sites (adopted April 2008)*, reads as follows:

Material Sites

Goal

Land for State-Owned Materials Sites. Maintain in state ownership and make available to public and private users sufficient, suitably located materials sites to meet long-term economic needs of the area for material resources.

Avoidance or Minimization of Impacts. Material extraction sites are to be sited so that they avoid impacts, including but not limited to noise and dust, to adjacent residential or institutional areas (i.e., schools).

Management Guidelines

A. Preferred Material Sites. When responding to a request for a material sale or identifying a source for materials, the highest priority should be given to using existing upland material sources. Using materials from wetlands, lakes, tidelands, and active or inactive floodplain rivers or streams should be avoided unless no feasible public upland alternative exists. As a general policy, sales or permits for gravel extraction will not be permitted in known fish spawning areas or within 150 feet of known spawning areas. Material sites shall be maintained in public ownership unless the management intent language for a specific management unit indicates that it may be appropriate for alternative uses.

B. Maintaining Other Uses and Resources When Siting, Operating or Closing Material Sites. Before materials are extracted, the adjudicator will ensure that the requirements of the permit or lease adequately protect other important resources and uses. The disposal of materials should be consistent with the applicable management intent statement and management guidelines of the plan. In some instances, areas occupied by a material site may be appropriate for reuse for settlement or another form of development. When this occurs, this is noted in the 'management intent' of the affected unit and reuse of the parcel for the intended use is appropriate. If this occurs, the reclamation plan shall take this into consideration and account for the probable reuse.

C. Land Sales in Areas of High Material Potential. Generally, if a settlement area contains sand and gravel deposits, rock sources or other similar, high value material resources, a pit area should be identified during subdivision design and retained in state ownership for future use.

D. Screening and Rehabilitation. Material sites shall be screened from roads, residential areas, recreational areas, and other areas of significant human use. Sufficient land should be allocated to the material site to allow for such screening. Material extraction sites adjacent to the Parks Highway shall provide a vegetation buffer of 75' or more. Rehabilitation of the site shall follow the requirements of AS 27.19.020 and 11 AAC 97.250.

E. Protection Area Adjacent to Anadromous Waterbodies. A riparian buffer of at least 150' shall be provided adjacent to anadromous waterbodies. The adjudicator is to review the DMLW on-line procedures pertinent to riparian buffers and Management Guidelines G and H in the 'Shorelands and Stream Corridors' section of this chapter prior to issuing an authorization or disposing of an interest in state land.

F. Coordination with Matanuska-Susitna Borough. Prior to granting authorizations for material sales, the DNR should coordinate with the Matanuska-Susitna Borough to determine applicable local land use requirements.

G. Other Guidelines Affecting Materials. Other guidelines will affect the use of material resources. See other sections of this chapter.

4.3 Matanuska Valley Moose Range Management Plan

The Matanuska Valley Moose Range Management Plan covers much of the area north of the Glenn Highway between MP 53 and MP 81. It has an extensive materials section and includes recommended areas.

The complete plan is available on the internet at the following address:

http://dnr.alaska.gov/mlw/planning/mgtplans/mat_valley/

The following excerpts from the plan are directly relevant to material sources.

Pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Matanuska Valley Moose Range Management Plan, Chapter 2 (adopted October 1986)* is as follows:

The Matanuska Valley Moose Range (Moose Range or Range) is an area rich in natural resource values. The lands within the Range support abundant fish and wildlife populations, contain marketable timber products and high-valued coal reserves and provide a variety of outdoor recreational and cultural opportunities.

The area also has abundant water resources and can provide for limited grazing opportunities. The use of natural resources often leads to resource use conflicts. In the Moose Range such issues involve the maintenance of wildlife habitat, heritage, water, recreational and scenic values while allowing utilization of forest products, mineral and grazing resources. A comprehensive management plan will play an essential role in the orderly use and protection of these resources.

The development and utilization of the natural resources within the Matanuska Valley Moose Range could also have dramatic effects on the local economy: creation of more jobs; expansion of support services; and possible improvements in schools, health and public services. Adverse effects of resource-related growth and development could result in increased local population; crowded schools and services; increased traffic on highways; as well as changes in air, water and scenic qualities; public overuse of their sources; and possible changes in rural lifestyles. By using a carefully developed plan for managing all of the resources, it is expected that many of the negative effects will be greatly reduced.

Also pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Matanuska Valley Moose Range Management Plan, Chapter 2-54: Materials (adopted October 1986)*, reads as follows:

RESOURCE DESCRIPTION

The Matanuska River and its tributaries contain an abundance of construction materials. Recent glacial and fluvial activity also created many upland landforms composed primarily of construction materials. The materials deposited by water are generally well-sorted beds with particle size ranging from sands and gravels to rocks and cobbles. The glacial deposits are often undifferentiated with particles of all sizes, often including fines (silt and clay particles) found together. Combinations and variations of the above conditions are also common in the geologically active lands of Moose Range.

Several material deposits are found along all the drainages with large deposits located in the upper drainages of Kings and Chickaloon Rivers and Boulder Creek. Lower Granite Creek also has a large deposit located on private lands. Other private lands along Murphy Road,

west of Sutton and near Drill Lake all contain deposits of construction materials. (See Map 11, page 29, for potential construction materials.)

Adjacent to the Moose Range, DOT/PF has several existing material sites located along the Glenn Highway. The Matanuska River floodplain is comprised primarily of construction materials.

RESOURCE EVALUATION

Construction materials are abundant in and adjacent to the Moose Range. A DGGS study indicated 8% or 11,000 acres of the Moose Range as having high potential for materials. An additional 25,000 acres (20%) are rated as having good potential. Further studies conducted by DLWM eliminated sites on private land and sites located 2 miles or more from present access. (The legislation precludes the state from planning on private lands within the Range.) This left 11 sites on state or borough land ranging in size from 30 to 640 acres totaling less than 2% of the Moose Range (see Map 2, page 13). These locations are adequate for planning purposes but field investigations prior to leasing (or permitting) is required to pinpoint the location of the material as well as verify the quantity and quality of the material. Field investigation may also reveal undetected limitations (e.g. spring or bedrock).

Anticipated material demands will be for road maintenance and local use only DOT may require moderate amounts of materials for development of forest harvest access roads. Presently no large construction projects are planned for the near future in the Moose Range.

Realignment of the Glenn Highway may occur within 20 years. If so, this project may demand large quantities of materials from the Moose Range. Other potential uses of large quantities of materials may be a coal fired power plant, mineral exploration or development or a hydro-electrical project.

The following list of “most suitable” sites begins in the west, where the greatest demand is anticipated, and continues to the east and lesser demand expectations.

Site #1. 80 acres located within the NE1/4, Sec. 4, T18N, R2E, S.M.

This site may be readily accessed off Buffalo Mine Road or from the Soapstone Subdivision. The area contains ice contact deposits which have been worked by water thereby reducing the silt content. The hilly terrain means most materials would be above the water table. Mining would be relatively easy and there is good visual screening potential.

Site #2. 80 acres located in the N1/2SE1/4, Sec. 20, T19N, R2E, S.M.

This site is accessed off Murphy Road. The landform is an alluvial fan that slopes to the south. This slope and location (elevation 1100' to 1200') may make visual screening of the site from the Glenn Highway difficult. This area may provide access for timber harvest/habitat enhancement projects below Arkose Ridge. Local demand may also be supplied from this site.

Site #3. 20 acres located in N1/2S1/2, Sec. 27, T19N, R2E, S.M.

This site is accessed from Premier Mine Road or from Elks Lake. The landform is an esker which indicates the source may be limited in extent. Despite this, the site may prove useful for timber harvest/habitat enhancement or mineral exploration and de-

velopment roads in the area. Materials for the potential power plant may have to come from other sources. Shallow depth to the water table and difficulty in screening are not expected at this site.

Site #4. 320 acres located in S1/2, Sec. 21, T19N, R3E, S.M.

This Borough land that is accessed from an unnamed road that leaves the Glenn Highway at Mile 59.9. Water worked ice contact deposits may provide a large quantity of material. Visual screening and mining should be easy in this hilly terrain. With Borough cooperation, this site may supply materials for both local and large project needs.

Site #5. 160 acres located in SE1/4, Sec. 8, T19N, R3E, S.M.

Although only 1.5 miles from Jonesville Mine Road, this site would be difficult to access because of wetlands. The 160 acres lie in a much larger alluvial fan. The actual material area may be as large as 600 acres. If developed, it is anticipated that 1) visual screening would be easy; 2) material quality may vary from good to high and; 3) the water table may be relatively close to the surface.

Site #6. 20 acres located NE1/4, Sec. 9, T19N, R4E, S.M.

This site is located near the Young Creek Trail and would most likely be developed only if this trail were to be upgraded. Visual screening and a shallow depth to the water table are not expected to be problems.

Site #7. 160 acres located in N1/2S1/2 and E1/2NE1/4, Sec. 16, T19N, R4E, S.M.

This area is accessed from Mile 66.7 of the Glenn Highway. The site is within the floodplain of the Lower Kings River. A large quantity of material is available here. Although visual screening should be easy, the water table may be shallow. Other factors to consider at this site include the nearby Chickaloon- Knik-Nelchina Trail with a 200' buffer and a possible state campground. This site also has potential for enhancing fish spawning beds in the river. This easily accessed site is anticipated to have high quality material in abundance.

Site #8. 640 acres located in NW1/4, Sec. 11, SE1/4, Sec. 2, W1/2, Sec. 1, T19N, R4E, S.M.

This area is accessed the same as Site #7, but is located about 1.5 miles further upriver. The floodplain site should provide enough materials for almost any project; however, it is expected its primary use would be for timber harvest/habitat enhancement projects or mineral exploration and development projects. Potential restrictions may include the Chickaloon-Knik-Nelchina Trail and groundwater near the surface. The site's low slope and remoteness would make visual screening easy.

Site #9. 40 acres located in the SE1/4NW1/4 and NE1/4SW1/4, Sec. 8, T20N, R5E, S.M.

This area is accessed from the Permanente Road. This site is an old alluvial fan. It is anticipated that the primary use of this site would be for the Permanente Road and any other roads developed off it. No estimates are made on material quantity or quality; however, limitations such as shallow depth to groundwater and visual screening are expected to be minimal.

Site #10. 40 acres NW1/4SE1/4, Sec. 23, T20N, R5E, S.E.

This site is accessed off the Castle Mountain Mine Road. The area actually has low potential but scattered pockets may provide enough materials for road maintenance and local needs. Another higher value site (Sec. 14, T20N, R5E, S.M.) can be found one mile north of this area, but access may prove difficult.

Site #11. 160 acres located in E1/2, Sec. 19, T20N, R6E, S.M.

This site is located in the floodplain of the Chickaloon River. Its primary use would be for trail maintenance on the Chickaloon River Trail or the Chickaloon-Knik-Nelchina Trail. This site may also be advantageous for fisheries enhancement. Difficulty in access, visual screening, and shallow depth to the water table reduces this site's visual value.

At present, there is little demand for the material deposits found in the upper drainages of Kings and Chickaloon Rivers and Boulder Creek. Until construction occurs within these drainages, or nearby sources are depleted, this large resource will most likely remain untapped.

The private lands with construction materials generally lie near improved access. Sources of construction materials located on privately owned land cannot be used without compensation to the private landowner. Privately owned material resources should be used whenever possible before using state-owned deposits within the Moose Range.

South of the Glenn Highway lies the Matanuska River floodplain which covers an estimated 3,000 to 6,000 acres. These sites to some extent would be replenished every spring and easily accessed in many places. These sources may provide large quantities of high-quality materials and should be considered along with sources within the Moose Range.

Also pursuant to *Alaska Department of Natural Resources, Division of Mining, Land & Water, Planning, Matanuska Valley Moose Range Management Plan, Chapter 3-129: Materials (adopted October 1986)*, reads as follows:

MANAGEMENT PLAN: MATERIALS

A.GOAL

Utilize materials (sand, gravel, building stone, limestone) within the Moose Range in a manner which does not adversely affect the fish and wildlife habitat or the scenic values.

B. MANAGEMENT STRATEGY

At the present time, the major demand for materials in the vicinity of the Moose Range is for gravel is for maintenance and reconstruction of the Glenn Highway. The major material sources are existing pits outside the Moose Range. However, it is expected that there will be some demand for materials with the Moose Range for logging or mining roads, trail maintenance, and local use. It is intended that applicants be allowed to use the source that is most economical for their purpose so long as that use is consistent with the following guidelines.

C. GUIDELINES

1. LOCATION OF MATERIALS SOURCES

a. Preferred Order. The preferred order of the sources for the extraction of sand and gravel is:

- (1) Private Lands
- (2) Existing upland pits outside the Moose Range (unless extraction from these sources has a negative impact on the views from the Glenn Highway).
- (3) Matanuska River floodplain.
- (4) Upland areas of the Moose Range.
- (5) Inactive floodplain sites in the Moose Range.
- (6) Active floodplain sites in the Moose Range.

The public and agencies are encouraged to seek the most preferred source that is economic and feasible.

b. Floodplain Sites. Floodplain sites within the Moose Range may become the preferred material source. They may be combined with a fisheries enhancement project at the request of ADF&G. These sources require ADF&G approval.

c. Alleviate Flooding. DNR will work with the Army Corp of Engineers to help alleviate flooding due to removal of materials.

d. Sites Within Water Sources. Material Sites located within stream, lake, or wetland buffers will be considered on a case-by-case basis with the concurrence of ADF&G. ADF&G shall review and approve any proposal to remove material from stream beds and floodplains within the Moose Range boundaries (see Map 8 on page 47).

e. Sites Within Historic Trail Buffers. Material sites may not be located within the buffer of the Chickaloon River Trails except for the purpose of maintaining the trail. The material site shall not be visible from the historic trail.

f. Sites Within Scenic Areas. Material sites may not be allowed in high value scenic areas from the Glenn Highway, as shown on Map 10 on page 199.

2. SCREENING

A natural, topographic or embankment screen sufficient to shield the material sites and equipment from the view of motorists traveling along the Glenn Highway, Buffalo Mine Road, Jonesville Mine Road, and Chickaloon River Road will be maintained where prudent and feasible.

3. ACCESS

The cleared area for an access road to a material site will be limited to 40 feet in width and the road shall be constructed with sufficient curvature to prevent direct view of the open excavation by the traveling public.

4. STREAM CROSSINGS

Where stream crossings are required for material site access roads, adequate bridges or culverts will be required to allow for high water flows and fish passage. An ADF&G Title 16 permit is required for anadromous fish streams (see Map 3 on page 23).

5. VEGETATION REMOVAL

- a. Utilization of Timber. If there is sufficient volume, standing timber in areas to be excavated for a material site or access road should be offered to the public. Trees less than 5 inches in diameter and brush should be buried or clipped and stockpiled within the site and later used for site rehabilitation.
- b. When and Where. Vegetation may be stripped no more than one year before pit development. The area of vegetation removal will be for the immediate areas of the excavation, access, sites for overburden storage, material stockpiles and equipment.

6. REHABILITATION

- a. Overburden. Stripped overburden will be stockpiled within the boundaries of each site. Upon completion of material excavation, the overburden which was temporarily stockpiled will be spread as evenly as possible across the floor and sides of the pit.
- b. Revegetation of Site. Material sites will be rehabilitated and revegetated to a plant species primarily beneficial to moose and approved by ADF&G. The expense of the rehabilitation will be borne by the developer of the pit.
- c. Slope Requirements. The sites will be excavated leaving side slopes of 3:1 or flatter, and all excavated surfaces dressed to relatively smooth contours for rehabilitation.
- d. ADF&G Approval. Material site rehabilitation plans must be approved by ADF&G. Sites adjacent to the Glenn Highway will not be enhanced to promote wildlife habitat for public safety reasons. Consideration should be given to rehabilitating these sites for long-term use as recreation facilities, e.g. roadside parking areas.

7. SITE MANAGEMENT

- a. Material Stockpiles. Material stockpiles will be located with the excavated pit when there is adequate room to store them there.
- b. Equipment. Screen decks, crushers and hot mix plants should be located within the pit when feasible. Hot mix plants should not be allowed near waters with fisheries values.
- c. Site Expansion. Excavated slopes suitable for future site expansion will be excavated leaving interim slopes of 4:1 or flatter but will not be rehabilitated until site expansion is completed. Plans for expansion of material sites must be reviewed by DNR and ADF&G for compatibility with public use, scenic views and wildlife habitat.
- d. Fuel Storage Facilities. Stationary fuel storage facilities must not be placed within the annual floodplain of a watercourse, closer than 100 feet to a waterbody and should be located outside of stream/lakeshore buffers. These must be contained or confined in a manner which would prevent any spillage from entering an adjacent waterbody.

e. Fueling Activities. Fueling activities shall not be conducted within 100 feet of any lake, river, stream, or drainage system, or on an annual floodplain or a watercourse. Such activities shall occur outside of stream/lakeshore buffers.

f. Fuel Spills. Absorbent material in sufficient quantity to handle operational spills must be on hand at all times for use in the event of fuel spill. The mining plan may require this if the operation is of sufficient size and duration.

g. Permanent Structures. Permanent structures are prohibited.

8. BEST MANAGEMENT PRACTICES

ADF&G will utilize its manual, Best Management Practices for Placer Mining in issuing its own Title 16 permits and in its review of and development of recommendations for the plans of operations and miscellaneous land use permits for material extraction. Any recommendation by ADF&G for rejection or modification of a miscellaneous land use permit or a plan of operations for materials extraction will be based on the Best Management Practices. (This document is available from the ADF&G habitat division in Anchorage, Palmer or Fairbanks, local libraries, DOMG in Anchorage and DLWM Anchorage and Wasilla offices for anyone interested in referencing the document while designing a mining plan of operations.)

9. WATER QUALITY

Drainage should be retained within the working site, with no turbid water allowed to enter adjacent streams from upland pit sites. Subsequent release of water must meet quality standards of the Alaska Department of Environmental Quality.

10. WATER BODIES AND RIPARIAN HABITAT

a. Water Body Requirements. There shall be no gravel removed below the active water table or within 50 feet of a waterbody unless material is part of a fishery enhancement project and approved as an exception to Group I and II stream buffer requirements (see page 98). Fifty feet is a minimum; a greater distance may be specified where necessary due to site conditions. Vegetation will not be disturbed within this buffer zone unless approved by ADF&G.

b. Shallow, Even Removal. Gravel shall be removed in shallow, even lifts so as not to create any pits or depressions which could entrap fish after periods of high water.

c. ADF&G Guidelines. Material sites used for fisheries enhancement will be done in accordance with ADF&G guidelines.

11. PUBLIC REVIEW

a. Subject to Public Review. Any material site greater than one acre in size shall go through the public review process.

b. Exempt From Public Review. Use authorizations of 25,000 cubic yards or less per year from existing material sites will not go through public or agency review.

12. BUILDING STONE

Applications to quarry building stone in commercial quantities within the Moose Range will be considered on a case-by-case basis. Rock quarry operations will be subject to the applicable guidelines in this chapter.

5.0 RELEVANT PUBLICATIONS

The following is a list of publications that may be useful for understanding the geology and material sources along the Southern Glenn Highway corridor.

Anchorage Quadrangle – A-8, B-7, and B-8

- Dobrovolsky, Ernest, and Schmoll, H.R., 1966, Map of geologic materials, Anchorage and vicinity, Alaska: U.S. Geological Survey Open-File Report 66-25, 1 sheet, scale 1:24,000.
- Fuglestad, T.C., 1986, Guidebook to permafrost and engineering problems along the Alaska Railroad between Anchorage and Fairbanks: Alaska Division of Geological & Geophysical Surveys Guidebook 6, 82 p., 2 sheets, scale 1:31,680.
- Glass, R.L., 1988, Map showing depth to bedrock, Anchorage, Alaska: U.S. Geological Survey Open-File Report 88-198, 1 sheet, scale 1:25,000.
- Reger, R.D., 1981, Geologic and materials maps of the Anchorage B-8 NE Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Geologic Report 69, 2 sheets, scale 1:25,000.
- Reger, R.D., 1981, Geologic and materials maps of the Anchorage B-8 NW Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Geologic Report 70, 2 sheets, scale 1:25,000.
- Reger, R.D., Combellick, R.A., and Brigham-Grette, Julie, 1995, Late-Wisconsin events in the Upper Cook Inlet region, southcentral Alaska, in Combellick, R.A., and Tannian, Fran, eds., Short notes on Alaska Geology 1995: Alaska Division of Geological & Geophysical Surveys Professional Report 117D, p. 33-45.
- Schmoll, H.R., and Dobrovolsky, E., 1972, Generalized geologic map of Anchorage and vicinity, Alaska: U.S. Geological Survey, I-787-A, 1 sheet, scale 1:24,000.
- Udike, R.G., and Ulery, C.A., 1988, Bedrock geology of the Anchorage (B-7SE) Quadrangle, Alaska: U.S. Geological Survey Open-File Report 88-418, 1 sheet, scale 1:25,000.
- Yehle, L.A., and Schmoll, H.R., 1987, Surficial geologic map of the Anchorage B-7 NW Quadrangle, Alaska: U.S. Geological Survey Open-File Report 87-168, 11 p., 2 sheets, scale 1:25,000.
- Yehle, L.A., and Schmoll, H.R., 1988, Surficial geologic map of the Anchorage B-7 SE Quadrangle, Alaska: U.S. Geological Survey Open-File Report 88-381, 19 p., 2 sheets, scale 1:25,000.

Yehle, L.A., and Schmoll, H.R., 1989, Surficial geologic map of the Anchorage B-7 SW Quadrangle, Alaska: U.S. Geological Survey Open-File Report 89-318, 33 p., 2 sheets, scale 1:25,000.

Yehle, L.A., Schmoll, H.R., and Dobrovolsky, Ernest, 1990, Geologic map of the Anchorage B-8 SE and part of the Anchorage B-8 NE quadrangles, Alaska: U.S. Geological Survey Open-File Report 90-238, 37 p., 2 sheets, scale 1:25,000.

Yehle, L.A., Schmoll, H.R., and Dobrovolsky, Ernest, 1991, Geologic map of the Anchorage B-8 SW Quadrangle, Alaska: U.S. Geological Survey Open-File Report 91-143, 30 p., 2 sheets, scale 1:25,000.

Anchorage Quadrangle – C-5, C-6, and C-7

Capps, S.R., et al., Geology of the upper Matanuska valley, Alaska, with a section on the igneous rocks: U.S. Geological Survey, Bulletin 791, 92 p., 2 sheets, scale 62, 500.

Daniels, C.L., 1981, Geologic and materials maps of the Anchorage C-7 SE Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Geologic Report 67, 2 sheets, scale 1:25,000.

Reger, R.D., 1981, Geologic and materials maps of the Anchorage C-8 SE Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Geologic Report 65, 2 sheets, scale 1:25,000.

Reger, R.D., 1981, Geologic and materials maps of the Anchorage C-8 SW Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Geologic Report 68, 2 sheets, scale 1:25,000.

Reger, R.D., Combellick, R.A., and Pinney, D.S., 1994, Geologic and derivative materials maps of the Anchorage C-7 NE Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Report of Investigation 94-24, 2 sheets, scale 1:25,000.

Reger, R.D., Combellick, R.A., and Pinney, D.S., 1994, Geologic and derivative materials maps of the Anchorage C-7 NW Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Report of Investigation 94-25, 2 sheets, scale 1:25,000.

Anchorage Quadrangle – D-1, D-2, and D-3

Grantz, A., 1961, Geologic map and cross sections of the Anchorage (D-2) quadrangle and northeasternmost part of the Anchorage (D-3) quadrangle, Alaska: U.S. Geological Survey IMAP 342, 1 sheet, scale 1:48,000.

Grantz, A., 1961, Geologic map of the north two-thirds of Anchorage (D-1) quadrangle, Alaska: U.S. Geological Survey IMAP 343, 1 sheet, scale 1:48,000

Alignment-wide

- Barnes, F.F., 1962, Geologic map of lower Matanuska Valley, Alaska, Geological Survey Miscellaneous Geologic Investigations Map I-359, scale 1:63,360.
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